**Mathematics Department**

**SIP Goal: Research**

**Department Vision or Purpose:** The Math Department thinks of mathematical research as a tool to provide the students with the opportunity to appreciate mathematics, to deepen a student’s understanding of a concept, and/or to engage the student in the mathematical thinking process. In a typical math class, the students expect the teacher to provide them with the information they need to successfully learn the material. As a department we believe that it is important to provide the students with opportunities to work independently, so that they can gain confidence in their ability to think mathematically and to appreciate the applications of mathematics in real-world settings. The internet , software packages (e.g. geometer’s sketchpad, etc.), books, and packets of material the teachers write are used in the research projects assigned in the middle and upper schools. This includes research on Greek mathematicians and pi, Fibonacci and the Fibonacci sequence, the origin of playing cards, the Egyptian method of adding (unit) fractions, applications of logarithmic and exponential functions in calculating compound interest, drawing conclusions from the analysis of available data, and the logic behind circuits. Middle school students are exposed to short applications of concepts learned in class, many of which require some research. Students also use Questia and other search engines to facilitate their research. Currently, most of the students complete at least one math research project in their math course. We do need to expand our current research project portfolio.

**Implementation:**

* In AP Stats
  + Regression Analysis and modeling data
  + Surveys and Analysis
  + Inference Projects
* Modeling physical systems with differential equations in AP Calculus 2
* In Adv. Precal & Differential Cal
  + Modeling physical systems with parametric equations
  + Art design using polar equations
* Sinusoidal modeling in pre-calculus
* In Geometry
  + Sherlock Holmes use of logic
  + Investigation of similarity
  + Dream House
  + Properties of concurrent lines
* 8th graders write an obituary for a Greek mathematician as part of an interdisciplinary projects.
* Algebra 2 students research pi and complete art design using linear functions.
* Math 6
  + Tessellations
  + Survey project
  + Graphing Project
  + Symmetry in the world around them